In the Claims:

1-25. (Cancelled)

26. (Previously Presented) A scanning electrochemical potential microscope (SEPM) comprising:

a polar solution;

a sample support that accommodates a sample immersed in the polar solution, wherein a potential gradient is formed at a surface of the sample by an electrical double layer;

a probe having a tip including a distal end disposed a perpendicular distance from the surface in the electrical double layer; and

a potential measuring device electrically coupled to said tip that measures a potential across said potential gradient.

27. (Original) The SEPM of Claim 26, further comprising a scanning actuator that provides relative scanning movement between said probe and said sample.

28. (Original) The SEPM of Claim 26, wherein said scanning actuator is a piezoelectric actuator.

29. (Original) The SEPM of Claim 26, further comprising a feedback circuit that generates a feedback signal based on said potential.

30. (Original) The SEPM of Claim 29, further comprising a Z-actuator that translates the Z-position of said tip in response to said feedback signal.

31. (Original) The SEPM of Claim 26, further comprising a Z-actuator that translates the Z-position of the tip in a spectroscopic mode.

32. (Original) The SEPM of Claim 26, further comprising a tuning device that modifies a sample potential at the sample surface.

33. (Original) The SEPM of Claim 32, wherein said tuning device is a bi-potentiostat.

34. (Previously Presented) The SEPM of Claim 26, wherein the polar solution has an associated ionic concentration.

35. (Original) The SEPM of Claim 34, wherein said ionic concentration can be modified to tune the operation of the SEPM.

36. (Previously Presented) The SEPM of Claim 26, wherein said polar solution is a selected species that has a selected ionic concentration.

37. (Previously Presented) A scanning electrochemical potential microscope (SEPM) comprising:

a sample support that accommodates a sample immersed in a polar solution, wherein a potential gradient is formed at a surface of the sample;

a probe having a tip including a distal end disposed a perpendicular distance from the surface;

a potential measuring device electrically coupled to said tip that measures a potential across said potential gradient; and

a feedback circuit to control a tip-sample separation in response to a change in the potential.

38. (Previously Presented) The SEPM of Claim 37, further comprising a tuning device that modifies a sample potential at the sample surface.

39. (Previously Presented) The SEPM of Claim 38, wherein said tuning device is a bi-potentiostat.

40. (Previously Presented) The SEPM of Claim 37, wherein the polar solution has an associated ionic concentration, and said potential gradient is formed by an electrical double layer, and said tip is positioned in the electrical double layer.

41. (Previously Presented) The SEPM of Claim 40, wherein said ionic concentration can be modified to tune the operation of the SEPM.

42. (Previously Presented) The SEPM of Claim 37, wherein the polar solution is a selected species that has a selected ionic concentration.